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<韓國側料資>

## Spotlighting Engineering Service Business in Korea

脚光받는 韓國의 技術用役業

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All Korea nprofessional engineer's great joy is to welcome the Japanese professional engineers and relevant guests to the 1987 Japan-Korea Professional Engineers Joint Convention organized by the Korean Professional Engineers Association.

As there exists an effort of blood, sweat and tear behind a succeeded theatrical stage, so an exquisite devotion with drawing up a master plan, investigation, supervision and etc by engineering firms is soaked through every part of huge construction projects and large unit factory buildings.

It is over 14 years that the Engineering Service Promotion Law has been enacted by the Ministry of Science and Technology. In the meantime, the domestic engineering (engineering service) have reached a remarkable higher level while the number of engineering firms participating in overseas market has gradually been increasing. From a small scale of under water investigation to a large scale planning of atomic reactor or petrochemical plant, engineering service business can be said "The Software of Total Industry."

Engineering service is what is called a higher business which offers specialized engineering know-how and experience. Engineering service compaines offer its specialized knowlege and experience to government, industry and commerce. Whether the task is to modernize plant equipment, to deisgn a building or to manage construction, an engineering company will develop and implement the most appropriate and cost effective solution.

Clients use the engineering service of firm knowing that the engineer's professional judgement is not influenced or biased by other commercial affiliations. While benefiting from the diverse experience that professional engineers can apply to a specific problem, government and industry also reduce the need for permanent in-house engineering staff. Engineering firms may be specialized or multi-disciplinary.

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The word 技術用役 used in Korea corresponds to the word 엔지니어링 used in Japan. The terminology 技術用役 is used only in Korea in Asia while Japan uses 엔지니어링 as it's (stands). In China 工程(pronounced "kongching": engineering process) is used. In English speaking region, engineering includes over-all business concept ranging from design, consulting, investigation to construction engineering while the construction engineering is excluded in Korea for the moment.

It was 1910s in the United States that engineering service field was taken concrete shape as a business. In those day when Ford Company mass-produced T-type automobile, the supply of gasoline was not smooth. An engineer doctor called Burton of this company developed a technique called "Burton Process", with which he refined gasoline from curde oil and amassed enormous property by obtaining a patent.

That was just the first case that man earned money from an invisible engineering know-how. Since then, as the process of petrochemistry in the United State, the process of fertilizer, fuel and powder in England and Germany made great progress, it became fixed as engineering service business. After World War II, construction, shipping, machinary business circles have also come to set up engineering firms by gathering their own engineers.

Taking a look at the Japanese engineering business, Japan from early pushed forward the supporting policy of engineering service, capable of reducing cost, quality control, and the development of new products by applying scientific technology developed by the then developed contries such as the United States, France, Germany and England. This has resulted in bringing up enormous engineering man power.

Besides, Japan has come to secure the superiority in many fields in the international industry competency by concentrating the related technologies on private industry sectors.

As Korea is in hast entering developed country, the nation is placed in such difficult positions as the introduction, digestion, improvement and development of technology should be pushing ahead simultaneously. Therefore, the responsibility for engineering services business can not be emphasized too much in Korea.

Nowadays, even large enterprises are taking advantage of higher engineering technology in managerial improvement. For example, task force system, one of managerial concepts in management, was also originally hit an idea of the martrix notation of engineering service.

Though the concept of engineering was introduced in 1960s by the Ministry of Construction of Korea, full-scale engineering began in 1973 with the interoduction of Engineering Service Promotion Law by the Ministry of Science and Technology.

Since then the number of engineering company has steadily increased, that is, from merely 46 companies in 1973, 122 companiens in 1976, 194 companiens in 1985 and it has rapidly increased to 330 in 1986.

As of the end of 1986, 15 plant engineering firms(産業設備用役業體), 7 integrated construction engineering firms(綜合建設用役業體), 193 specialized engineering firms(專門技術用役業體), and 65 individual engineering firms(個人技術用役業體) have been registered to the Ministry of Science and Technology, and it totals 330 various engineering firms.

The total number of received engineering orders in 1986 was 8869, amounting to 363 billion 337 million Wons. Of the total, 8819 orders were domestic, amounting to 332 billion 267 million

Table 1. Status for Specialized Engineering Business Circle As of the end of 1986

Contents Special Eng'g Firms	Date of Foundation	Capittal (100 mil. Won)	Contract Amount of 1986 (Million Won)			Specialized Fields	Orders Received (No. of Orders)	
			High Class Engineers		Overseas Contract A. amount(No.)			
			Prof. Engineer	etc.				
Construction Jun Hung Corp.	83.12	8.8	4	5	879(20)	879	Construction	Roads (1), harbors (2), water, supply (5), water reso (1).
Keun-In Eng. Corp.	84.11	0.5	2		389(27)	389	"	Region, city planning (24) roads, air port (3).
Kyung-II Eng. Crop.	84.10	0.5	4		556(49)	556	"	Roads, airport (12), water supply (16), region, city plan (16), etc.
Dae-San Eng.	79.7	0.7	2	1		3293(1)	Machinery	Maintenance of supervision of auto-mobile of Saudi Almoti Co., Ltd.
Dae-Woo Facility Research Cent.	85.1	0.5	2		143(29)	8(2)	"	Design of air con. system Bang la-Desh.
Dae-Han Eng.	76.11	3	5		2070(29)	2070	Elec. tele-com. mach. infor. pro.	KTA. subway, atomic power plant. rail way.
Dae-Han Shipping Crop.	37.7	332	14	3	13(7)	2848(3)	Marine. constr. aviation	Design of marine, const. Design of harbor. etc.
Sam-Young Faci.	77.4	1.2	3	1	391(38)	56(1)	Constr. facili.	Saudi SAFW Project.
Woo-Bo Eng. Crpo.	77.9	4.5	6	9	1133(21)	991(16)	Construction	Water supply (5), roads & airport (2), civil structure (8), etc.
You-Won Const.	84.6	65.6	2		11(1)	34(1)	Constr. Facie. Machine	Air con. Shoe factory design Saudi.
June-Ang Eng. Develop. Corp.	84.11	0.5	3		414(15)	95(3)	Construction	Roads(2), region, city plan (2) water supply (3).
Chun-II Eng. Corp.	76.1	0.5	6	2	1496(68)	217(1)	"	Region city plan (41), civil structure, (17), etc.
Railway Eng. Corp.	63.4	2	1	2	462(73)	28(2)	Machine	Design of locomotive with Marubeni Japan.
and other 317 Firms.....								..... Omitted .....

Table 2. Status for Plant Engineering and Integrated

Plant & Integrated Construction Firms	Contents	Date of Foundation	Capital (100 Mil. Won)	High Class Engineers		Contract Amount 1986 (Million)		Total
				Prof. Eng.	etc.	Domestic	Overseas	
						Contract Amount (No.)	Contract Amount (No.)	
Plant Engineering	Kukje Develop.	77.11	26		1	116(3)		116
	Daelim Eng.	74.7	35	28	57	10898(58)	4969(5)	15,867
	Daewoo Eng.	76.10	12	40	99	17378(152)	23750(30)	41,128
	Dong-Ah Eng.	76.4	10	15	31	2951(33)	1698(2)	4,649
	Lucky Eng.	78.10	15	19	13	14965(86)	12155(6)	27,120
	Sunkyoung Eng.	62.2	150	22	45	334(6)	334(6)	334
	Shnhwa Const.	69.8	84	13	23		1544(1)	1,544
	Yougong	63.10	1060	11	25	1080(5)		1,080
	Chung Eng.	71.5	16	12	18	3678(3)	106(2)	3,784
	KECO.	75.10	50	69	141	13882(44)	554(1)	14,426
	Hyundai Eng.	74.2	25	66	33	19087(76)	4692(16)	23,779
	Hyundai Heavy	73.12	1697	13	21	9191(134)	2255(3)	9,191
	Korea Heavy	63.9	421000	16	14		754550 (Dollars)	
	Korea Eng.	70.1	1000	19	19	9489		
Iron & Steel Eng.	70.7	1033	20	15	8628	699415 (Dollars)	9,231	
Integrated Construction Engineering	Dowha Eng.	57.8	15	24	9	9191(134)		9,191
	Dongmyung Eng.	60.10	10	13	15	4460(174)		4,460
	Saman Const.	67.12	10	27	18	10772(53)		10,722
	Sunjn Eng.	78.4	12	24	23	6723(107)	33(1)	6,756
	Yousin Plan.	66.1	10	20	25	3727(91)		3,727
	Jungwo Eng.	79.7	10	21	30	4266(75)		4,266
	Hankuk Integ	63.3	10	48	142	8240(98)		8,240

Construction Engineering Business Circles

As of the end of 1986.

Ranges of Engineering Business											
Indus- trial Fac- tory	Integr- ated Dontst	Archit- ec. Facili.	Infor. Process	Integrat Enviro.	Teleco- mm.	Machine	Electric	Atomic	Soil	Marine	Chem- ical
○	○	○	○								
○	○			○							
○	○			○							
○	○			○	○	○	○				
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○	○										
○			○					○			
	○						○				
	○			○		○	○		○		
	○	○				○	○				
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	○						○				○
	○	○		○			○				

Wons, namely, 91% was domestic projects, while 150 orders were overseas, amounting to 31 billion 70 million Wons, namely, about 14% was overseas projects.

Table 1 introduces the status of some of the total 317 specialized engineering firms and individual engineering firms.

This is an increase of some 42% compared with 1985 and an increase of some 27% compared with the total amount. Though the annual receiving orders amounted to about 360 billion Wons as mentioned above, about five times of which, namely, some 1 trillion 800 billion Wons is related to various engineering services business directly or indirectly.

As mentioned above, engineering services business is classified into four categories according to the range of specialized fields, namely, plant engineering service, integrated construction engineering service, specialized engineering service and individual engineering service. As professional engineers we all know the difference between the four engineering services. Anyway, the biggest property in engineering business is highly skilled engineering man power.

Large scale factory construction still depends on advanced technology. With the level of the present domestic engineering services, more than 90% of the over-all designs in large civil construction fields such as roads, harbors and dams are disposed of by domestic engineering service while small and medium size factory such as cement, ceramic, and tire have reached a level capable from turn-key base construction. However, the fundamental design of iron and steel making factory depends on advanced technology while some parts of detailed designs are possible from domestic firms.

Table 2 introduces the status of all 15 plant engineering firms and all 7 integrated construction engineering firms and my company is introduced on the fourth column.

The most important concept in engineering service is optimum. For example, in case of constructing a dam, the design should be the strongest one which will not be ruined for ever while the required amount of cement should be minimum. This corresponds to the foundation of one country as well. It can be said integrating the respective construction projects are linked together with a foundation of one country.

Mere misdrawing a line on a design paper would incur a waste of several million sacks of cement. Thus, it is understandable how engineering service is important and requires accuracy. For another example, foreign loan has become a pending problem in newly industrializing countries (NICs). It may attribute to mistakes from engineering services. It is sometimes said that some 10 billion dollars out of the total foreign loan can be saved if engineering is correctly executed.

Though almost all engineering firms entrusted its designs to foreign firms in 1960s and 1970s, the number of Korea engineering firms employing foreign professional engineers has been gradually increasing in 1980s. This is an indication that the nation has gradually come to realize the importance of engineering business as it is making its way into industrialization.

In the meantime the level of the domestic engineering business circles has also remarkably risen and the example of specialized engineering firms finding new overseas market has been increasing. Though a system improvement, for example, changing from the current lowest bidding system to an engineering quality competition system is important in engineering service, important above all is an effort to solve all possible problems by themselves, avoiding indiscreet

preference to other's know-how or experience except as an educational tool.

Engineering business is typically a knowledge intensive industry and its spreading effect to related industries plays not only an intermediary role capable of inducing technology as self-reliance of total industry, but also it has the speciality utilizing higher skills and engineering man power. Therefore, it is the most bright industry in such countries as Japan and Korea scarcely blessed with natural resources.

The Japan-Korea Professional Engineer's Regular Joint Convention was inaugurated on October 21, 1971 with 17 Japanese professional engineers' coming over to Seoul. Therefore, we have a long history of 17 years by today's meeting.

Our firm belief always remains unchanged that we must share the benefits of our engineering experiences with those who are in the process of their own course of development. Japan and Korea are also willing to cooperate with any country in advancement of profession and promotion of both with technology transfer.

The Korean professional engineers sincerely hope that this regular joint meeting will be prosperous and greatly contribute to the development of engineering or consulting business of both countries.

—The End—